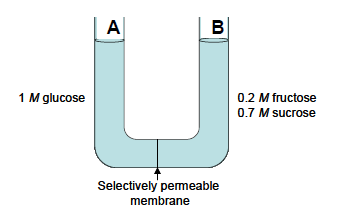
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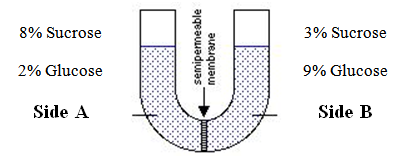
**Osmosis Practice Worksheet**

Mrs. Krouse, AP Biology



**Basic Osmosis Problems**

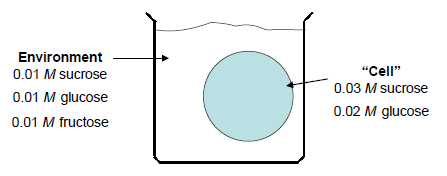
1. A solution of 1 M glucose is separated by a selectively permeable membrane from a solution of 0.2 M fructose and 0.7 M sucrose. The membrane is not permeable to the sugar molecules. Indicate which side is initially hypertonic and which is hypotonic. Show, using arrows, the direction of osmosis. (*Note: You can find the total solute concentration in a solution on one side of the membrane by adding up the concentrations of the individual solutes. For example, the total solute concentration on side B is 0.9 M. I determined this by adding 0.2 M fructose to 0.7 M sucrose).*

2. The solutions in the two arms of this U-tube are separated by a membrane that is permeable to water and glucose but not to sucrose.

a. Initially, the solution in side A is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_with respect to that in side B. (Options are hypotonic, hypertonic, and isotonic.)

b. After the system reaches equilibrium, describe what changes are observed (i.e. what direction have glucose, sucrose, and water moved?). *Note: Determine how much solute ends up on each side before predicting the direction of water movement.*

3. An artificial cell consisting of an aqueous solution enclosed in a selectively permeable membrane has just been immersed in a beaker containing a different solution. The membrane is permeable to water and to the simple sugars glucose and fructose but completely impermeable to the disaccharide sucrose.



a. Which solute(s) will show a net diffusion into the cell?

b. Which solute(s) will show a net diffusion out of the cell?

c. Before anything moves, the cell solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with respect to the environment solution. (Options are hypotonic, hypertonic, and isotonic.)

d. In which direction will there be a net movement of water?

4. Red blood cells are placed in three beakers containing the following solutions: beaker A, distilled water; beaker B, isotonic solution; and beaker C, 5% salt solution (higher than the salt concentration of the red blood cells). Describe the effect each solution will have on the cells and explain why.

a. Cells in beaker A:

b. Cells in beaker B:

c. Cells in beaker C:

For each of the statements below, put a checkmark in the column that corresponds to the type of solution described.

|  |  |  |  |
| --- | --- | --- | --- |
| **Statement** | **Isotonic Solution** | **Hypotonic Solution** | **Hypertonic Solution** |
| 5. The concentration of dissolved solutes in the solution outside the cell is lower than the concentration inside the cell. |  |  |  |
| 6. The concentration of dissolved solutes in the solution outside the cell is the same as the concentration inside the cell. |  |  |  |
| 7. The concentration of dissolved substances solutes in the solution outside the cell is higher than the concentration inside the cell. |  |  |  |

8. Why does a plant like celery get limp when placed in a hypertonic solution?

9. A salt water protozoan (a single celled protist) is transferred to a freshwater lake. What might happen to the protozoan?

10. What type of solution—hypotonic, hypertonic, or isotonic—do doctors use for IV fluids? Hint: the goal of IV fluid is to rehydrate the body but keep the size of the blood cells the same!

11. Define the following terms in your own words… Explain which type of cell (plant or animal) will enter this state, and identify the type of solution (outside the cell) in which this will occur.

* Flaccid
* Lysed
* Turgid

* Shriveled
* Plasmolyzed